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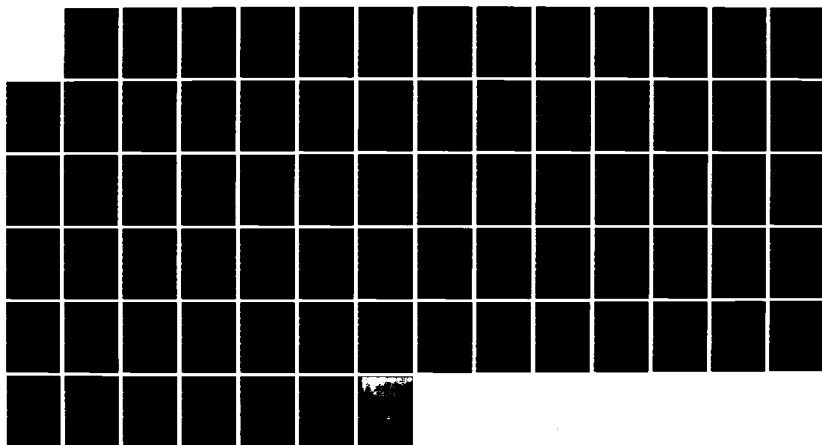
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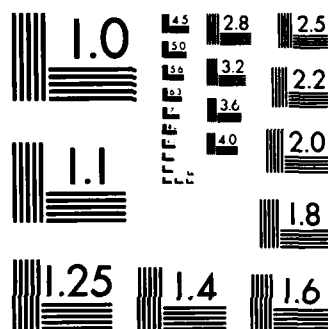
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Author: William J. Mitchell, Capt, USAF, MSC

Abstract: The crowded conditions in the surgical suite of the United States Air Force (USAF) Regional Hospital Eglin provided the impetus for this project. Specifically, there is congestion in areas for personnel, administrative functions, and storage of supplies and equipment.

A major obstacle in developing appropriate solutions to reduce the congestion, had been the lack of a determination of the amount of area which was necessary. This study attempted to determine the area necessary and use it as a basis for a quantitative evaluation of the surgical suite and central sterile supply.

The methodology employed in this study used Air Force guidelines and local workload factors to determine the optimal allocation. The results were used to evaluate the area currently available in the surgical suite and central sterile supply.

As a result of the area evaluation, the surgical suite of the USAF Regional Hospital Eglin was found to have a total deficiency of 2,000 square feet, approximately 30 percent. The evaluation of central sterile supply identified a deficiency of 1,600 square feet, or approximately 60 percent. The deficiencies represent the spatial difference between the standard design criteria and the present amount of area available.

THE SURGICAL SUITE OF THE USAF REGIONAL HOSPITAL EGLIN:
FACILITIES FOR TODAY AND THE FUTURE

by

William James Mitchell

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SUMMARY

The crowded conditions in the surgical suite of the United States Air Force (USAF) Regional Hospital Eglin provided the impetus for this project. Specifically, there is congestion in areas for personnel, administrative functions, and storage of supplies and equipment.

A major obstacle in developing appropriate solutions to reduce the congestion, had been the lack of a determination of the amount of area which was necessary. While a shortage of area was found to be the cause of the congestion, the crowded conditions were not previously known to be caused by a lack of area or an inefficient use of the area. This study attempted to determine the amount of area necessary and use it as a basis for a quantitative evaluation of the surgical suite and central sterile supply.

Air Force directives were reviewed to evaluate the surgical suite and central sterile supply areas. The USAF maintains specific space planning criteria, which are used to evaluate and control facility planning. The criteria are based upon directives and guidelines received from Headquarters USAF and the Department of Defense (DoD). The methodology employed in this study used the Air Force guidelines and local workload factors to determine the standardized area recommended for the surgical suite and central sterile supply. The derived recommendations were used to evaluate the existence of an excess or shortage of area in the surgical suite and central sterile supply of the USAF Regional Hospital Eglin.

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As a result of the area evaluation, the surgical suite of the USAF Regional Hospital Eglin was found to have a total deficiency of 2,000 square feet, approximately 30 percent. The evaluation of central sterile supply identified a deficiency of 1,600 square feet, or approximately 60 percent. The deficiencies represent the spatial differences between the standard design criteria and the present amount of area available.

Additional area for the surgical suite could not be obtained by expansion through new construction. The surgical suite is located on the second floor of the facility, which limits expansion to areas which are occupied by other services. One of management's desires was that additional expansion of the surgical suite should not be at the sacrifice of patient beds.

An expansion of the surgical suite into what is now central sterile supply was the most acceptable alternative to eliminate the congested conditions. A relocation of central sterile supply would provide a more generous allocation of area for both the surgical suite and central sterile supply. ↑

CHAPTER I

INTRODUCTION

The USAF Regional Hospital Eglin, Eglin AFB, Florida, has extremely crowded conditions in the surgical suite, which includes recovery and anesthesia. The crowded conditions are especially acute personnel areas, administrative areas, and supply and equipment storage areas.

The personal locker area is limited to 130 square feet for 18 male personnel and approximately 100 square feet for 18 female personnel. Each locker room is allotted one toilet and the female locker room does not have shower facilities. The staff lounge has only 160 square feet versus the recommended 360 square feet for the 36 authorized personnel. There is no conference room or area for teaching within the surgical suite.

The crowded conditions are even more severe for administrative functions. The charge nurse of the surgical suite does not have an office but shares the counter area at the department's central control station. Physicians do not have isolated dictation facilities. The supply manager is required to share approximately eighty square feet of office area with the non-commissioned officer supervisor. The anesthesia department has one office, approximately ninety square feet, for three anesthesiologists and four anesthesiologists.

The surgical suite's supplies are being stored in hallways, locker rooms, and the recovery room. Equipment is stored wherever area can be found. X-ray units, used in the operating theater, are stored outside the surgical suite in the public hallway. Patient gurneys are also stored in the public hallway. Orthopedic equipment is "accumulated" at the end of the inner hall of the surgical suite. Technicians are required to cross through an operating theater to obtain specialized surgical equipment.

Solutions to the overcrowding are limited because of the surgical suite's location. It is located on the second floor of the hospital with patient wards on either side. New construction of additional area would not be possible in the present location. Any internal expansion could decrease the total number of patient beds. In 1975, an expansion project, which increased the number of operating theaters from three to four, reduced the bed capacity of an adjoining patient ward by three beds.

Central sterile supply, which is colocated with the surgical suite, also has a problem of overcrowding. An expansion of the surgical suite which would not reduce the number of beds would require a relocation of central sterile supply. The need for additional storage area in central sterile supply is expanding as the clinics and services supported increase the size of their inventories. As a result of overcrowding, central sterile supply has been the subject of several safety inquiries. The workcenter has been cited for fire hazards because inventory is stacked too close to the ceiling, and empty boxes are collected in public corridors.

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The research included a historical review of the facility in an attempt to highlight factors which may have contributed to the present overcrowding. Through a determination of the causes, more feasible solutions may be developed.

Historical Review

The USAF Regional Hospital Eglin, Eglin Air Force Base, Florida, is located on the panhandle of the Florida gulf coast. As a regional hospital within the Department of Defense Health Care System, the hospital serves as a referral center to three Air Force hospitals and one Army hospital, located in the southeastern United States. The primary mission of the USAF Regional Hospital Eglin is to provide medical care to 12,000 active duty military members assigned to Eglin Air Force Base and their approximately 30,000 dependents. In fiscal year 1982, the hospital's outpatient clinics provided services for 345,630 patient visits, with 7,275 inpatient admissions for a total of 47,689 bed days. For the same period, the surgical suite performed approximately 2,800 operative procedures.

Physical Plant

Prior to 1964, the physical plant of the USAF Regional Hospital Eglin was a wood-framed cantonment facility. In 1964, the office of the Air Force Surgeon General approved the design of a new 122,374 square foot, 125 bed facility. When funds were appropriated in the 1965 Department of Defense budget, construction began. Midway in the two year construction program, a 75 bed psychiatric ward was added to the original design. The addition was included as part of the inpatient

tower and increased the size of the tower from three to four stories. The facility was completed and operational in 1967.

A design for expansion, which increased the total area of the facility by 113,200 square feet, was proposed in 1971. It provided a second tower, housing outpatient and ancillary services. Included in the 1971 proposal was the modification of specific areas that were part of the original design.

The construction phase of the expansion project lasted from 1973 to 1976. Today, the hospital is operating as a 200 bed facility with 165 beds in use.

Surgical Suite

The original design of the surgical suite included three operating theaters and all required ancillary and support services. The space planning criteria applicable at the time of the original design, 1964, recommended an optimal area allowance of 3,524 square feet. The actual size of the surgical suite, after design and construction, totaled 3,721 square feet.

Between the time of original construction and the design for modification in 1971, the criteria for area within the surgical suite increased by 17 percent. The criteria of 1971 specified an increase of 600 square feet for surgical support areas over the 1964 design criteria.

The 1971 expansion and renovation project further restricted areas available for surgical suite support functions. A fourth operating room was added to the surgical suite by reducing the number of beds in an adjoining patient ward. There was no additional area

provided for surgical suite support functions. In addition, staffing authorizations have increased from 17 individuals in 1964 to 36 in 1983.

The space planning standards of 1983 reflected an additional increase of 59 percent for surgical suite support functions since 1971. Specifically, recommended area for storage of supplies increased from 130 square feet in 1971 to 450 square feet in 1983, a 346 percent increase. It was evident that there has been a growing requirement for storage area in the surgical suite over the past 12 years. A primary cause of the increased need for supply storage area is the amount of disposable supplies which are used in the surgical suite and other patient care areas. Items which had previously been sterilized and reused are being replaced by one-time use products. The amounts of disposable items which must be maintained on inventory create a negative impact on storage areas. The increasing storage requirements for supplies and equipment is identified in the review of the literature as a problem in surgical suites and is not isolated to the surgical suite of the USAF Regional Hospital Eglin.

The review of the literature stated specific causes of overcrowding in surgical suites and possible solutions. After an evaluation of the surgical suite's area, possible alternatives to eliminate the crowded conditions will be presented and recommendations made.

Review of the Literature

The beginning of this project first took place in April of 1982. At that time an area utilization survey was conducted to investigate a

perceived deficiency in personal area and area for storage of supplies and equipment (Appendix A). The survey identified a shortage of area for the staff lounge, locker rooms, supply inventory, and equipment storage. Recommendations ranged from doing nothing in the immediate future to implementation of a central processing distribution system. Further research was recommended prior to implementation of any of the perceived solutions.

Since this problem has several facets, multiple sources of information were researched. In order to develop an immediate supervisor's perspective, AORN Journal and Today's O.R. Nurse were reviewed. Hospitals and NATNEWS provided an upper level management viewpoint. Hospital Materiel Management Quarterly provided details of various supply options. Air Force directives were reviewed to insure compliance with existing criteria for design, staffing, and operation of a surgical suite and central sterile supply. The review of the literature was conducted to reveal the possible nature of existing problems as well as the feasibility of various solutions.

Problems

The review of the literature revealed several causes of overcrowding in hospital facilities. Overcrowding was found to be a result of advances in medical technology, increased use of disposable supplies, and poor initial planning.

Advances in medical technology have brought an increase in equipment and support personnel. According to Kernaghan, the influx of sophisticated equipment typically requires not only more area in the operating theater but also complicates housekeeping and increases the

area required for storage. Additional personnel required to operate and maintain the new equipment also tax limited locker areas and staff lounges (2, pp.101-105).

The increased use of disposable supply items has created a need for additional storage area and increased the amount of time required for inventory management, as pointed out by Kowalski. Many surgical suites which have been in existence more than 5 years do not have sufficient area allocated for the increased storage requirement of disposables (3, pp.81-97).

Poor initial planning is often a cause for overcrowding within hospitals. Phillips suggests that the cause for complaints of minimal area for storage, staff lounges, and restrooms is poor initial designs. Shortages can often be traced back to the planning stages, when in the interest of economy, these areas were identified as the most acceptable for cost containment (4, pp. 7-14).

Possible Solutions

Possible solutions to the overcrowding, as proposed in the literature, are physical reconfigurations, transference of inventory responsibilities, and implementation of a central processing and distribution system.

To correct, or at least improve, the shortage of area, Reeves suggested a reconfiguration and enlargement of the surgical suite if possible. Any reconfiguration should use the more efficient designs which incorporate the positioning of equipment and proper traffic patterns (6, pp.17-22). Reeves viewpoint contrasted with Richardson who recommended the removal of all inventory functions from the surgical

suite. The surgical suite would then be serviced by a central supply distribution system (5, pp.13-17).

Various types of central processing systems were examined in Kowalski's article, Supply Distribution Options - A New Perspective. The pros and cons were discussed for requisition, par-level, and exchange cart methods. Also included were inventory reduction potential, capital expense, efficient use of area, and management control (3, pp.81-97).

Air Force directives specify facility design, personnel support, and services to be offered. The directives also recommend consideration of a central processing and distribution system as a viable option to reduce inventory area, increase management effectiveness, and provide better cost containment (1,p.10-7).

The literature identified some specific reasons for the overcrowding in surgical suites and also discussed possible solutions.

CHAPTER II

METHODOLOGY

The subject of this study necessitated the establishment of the cause or causes of the overcrowding in the surgical suite. It was essential to determine if the overcrowding was the result of a lack of area or the inefficient use of the area available. Governmental guidelines were used as the primary source for evaluation in this study.

Source

All military health facilities are designed and governed by specific DoD directives and guidelines which control the planning and construction of health care facilities, the services provided, and the beneficiary population served.

An integral part of the DoD's control of health facilities is the Air Force regional Health Facilities Office (HFO). The Eastern Region HFO, which services the USAF Regional Hospital Eglin, is located in Atlanta, Georgia and is responsible for validating requests and managing the design and construction of any approved and funded facility projects.

Prior to construction at an Air Force health care facility, design requests must be submitted to and approved by the regional HFO. The requests are validated through a comparison of current standards and

guidelines which reflect the latest procedures and directives issued by the DoD and Headquarters U.S. Air Force.

A review of the 1982 criteria, as provided by the Atlanta HFO, was the basis of determining the causes of the overcrowding in the surgical suite and central sterile supply.

Guidelines

All guidelines received by the HFO for planning purposes are incorporated into the "Space Planning Criteria" computer program (Appendix B). The user of the model can determine the standard area recommended for the design of health care facilities. The standards can also be used to evaluate the adequacy of existing facilities.

In order to determine the recommended area for the surgical suite of the USAF Regional Hospital Eglin, specific local data were used as variables. The data included historical workload factors, staffing authorized, and services provided. Many of the requirements were determined through a cumulative process. That is, the number of operating theaters determined the number of recovery beds, which then determined the number of isolation recovery beds.

Once the optimum standards were determined, it was possible to make an evaluation as to the adequacy of the current area in use. The evaluation was made with the assumption that there would be no major mission changes which would affect the workload or staffing of the surgical suite.

The results of the evaluation, comparing standard to actual area available, provided the foundation of this project. The space planning

criteria were evaluated against the current configuration of both the surgical suite and central sterile supply. The surgical suite was segmented and evaluated in five areas: surgical pavilion, administration, anesthesia, recovery, and support areas. Central sterile supply was included because of its collocation with the surgical suite.

Once the analysis of the areas was completed, alternatives to alleviate the overcrowding were considered. The various possibilities were weighed with respect to cost effectiveness, use of current area, and effect upon other services. The source and amount of funding was not a limitation upon any of the alternatives.

CHAPTER III

FINDINGS

The surgical suite was evaluated to determine the cause or causes of the present overcrowding. Included in the evaluation was central sterile supply, which is colocated with the surgical suite. Based on the results of the findings, alternative solutions to eliminate the congestion were discussed.

Surgical Suite Area Analysis

The comparison of standard versus actual area within the subdivisions of the surgical suite of the USAF Regional Hospital Eglin identified an overall shortage of approximately 1,970 square feet (Table 1). The shortage is the difference between the actual area available and the area recommended by the space planning criteria. The current design of the surgical suite is displayed in Figure 1.

Surgical Pavilion

The USAF Regional Hospital Eglin has four operating theaters. Based upon the current design criteria, the facility is authorized three operating theaters, rather than the four which are currently in use. Any proposed projects for new construction/renovation must be based upon the current authorization of three operating theaters. Even though the fourth operating theater is no longer justified, it should not be

considered for dismantling because of the workload it could support in an emergency.

Table 1. A Comparison of Standard Versus Actual Area in the Surgical Suite

Surgical Suite Division	Approximate Square Footage	
	Standard	Actual
Surgical pavilion	1,460	1,790
Administration	300	130
Anesthesia	990	240
Recovery room	1,350	1,360
Support areas	<u>2,460</u>	<u>1,070</u>
Totals	6,560	4,590

As evidenced in Table 2, three operating theaters require a total of two scrub areas, one single unit and one double unit. The current configuration provides three scrub areas. Three of the four operating theaters have one scrub area per theater while the fourth operating room has two scrub areas.

Sub-sterile work areas, positioned between operating theaters, compare at a total of 310 square feet of area against a standard of 280 square feet.

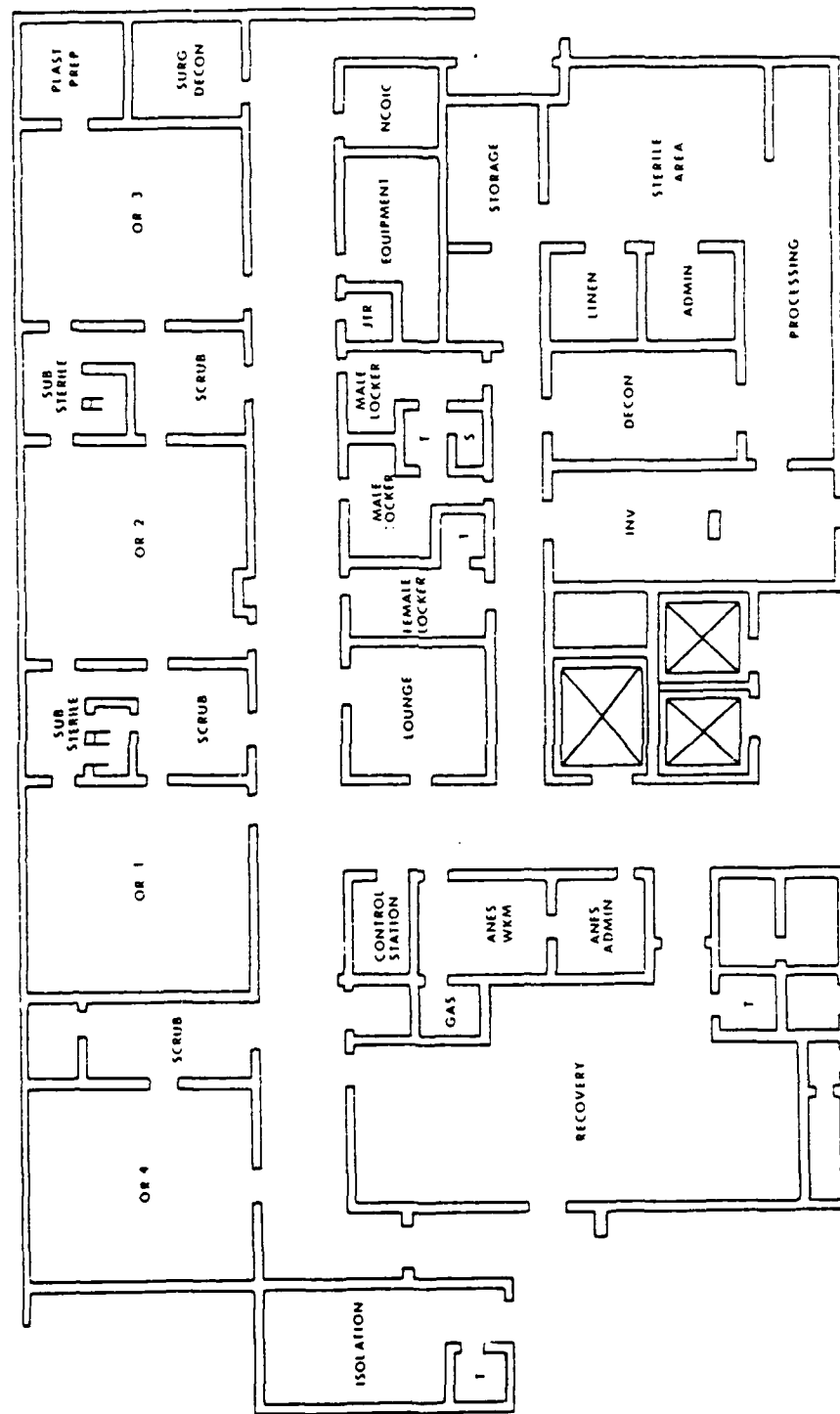


Figure 1. Current Design of Surgical Suite and Central Sterile Supply of
USAF Regional Hospital Eglin

The evaluation of the surgical pavilion does not identify a shortage in available area, based on the criteria.

Table 2. A Comparison of Standard Versus Actual Area for the Surgical Pavilion

Surgical Pavilion	Approximate Square Footage	
	Standard	Actual
Operating Theaters - general (2) ^a	800	810
cystoscopic (1)	260	390
scrub area - double (1)	80	(2) 215
single (1)	40	(1) 65
Sub-sterile -140 SF per 2 OR's (2)	<u>280</u>	<u>310</u>
Total	1,460	1,790

^a The number enclosed in parentheses indicates the number of rooms recommended or in use.

Administration

The HFO planning criteria recommend three administrative areas, two offices and a control station, within the surgical suite (Table 3). The department has one office and a central control station. The control station, which has half of the standard area recommended, serves as the sole administrative area for nursing functions. The nurse supervisor of the surgical suite does not have an office. The only private administrative area is shared by the non-commissioned officer in charge (NCOIC) and the workcenter's supply manager. The office is used

for maintaining training records, processing of administrative correspondence, supply management, and personal counseling.

Table 3. A Comparison of Standard Versus Actual Area for Surgical Suite Administration

Administration	Approximate Square Footage	
	Standard	Actual
Central control station	100	50
Nurse supervisor office	100	---
NCOIC office	<u>100</u>	<u>80</u>
Total	300	130

Anesthesia

The anesthesia department, a subdivision of the surgical suite of the USAF Regional Hospital Eglin, functions with less than 25 percent of the recommended area. The space planning criteria permits one office for each anesthesiologist assigned, one office for the chief anesthesiologist, and one office for every two anesthesiologists assigned (Table 4). The present anesthesia department has one office which is shared by all the anesthesiologists. A desk placed in the recovery room is used by the remainder of the department staff.

Table 4. A Comparison of Standard Versus Actual Area for Anesthesia

Anesthesia	Approximate Square Footage	
	Standard	Actual
Anesthesiologists office (3 x 100') ^a	300	90
Chief anesthetist office (1 x 120')	120	--
Anesthetists office (1 x 170')	170	--
(1 x 100')	100	--
Anesthesia workroom	150	115
Gas storage	50	35
Induction room	<u>100</u>	<u>--</u>
Total	990	240

^a The set of numbers enclosed in parentheses and separated by the lower case "x" is the number of rooms and the recommended square footage per room.

The standard area recommended for the anesthesia workroom is 150 square feet. The present workroom has 115 square feet of processing and storage area.

The planning criteria recommend 100 square feet for a patient induction room. The present design does not provide a separate waiting area. Patients are "parked" in the entry hall of the surgical suite while awaiting entry to their assigned operating theater. This arrangement requires that processing by nurses and anesthesia personnel take place in the surgical suite hallway rather than in a private area.

Many times the patients are able to observe their assigned operating theater being cleaned after the previous case. When there is any unexpected delay, the patient must endure the inconvenience of waiting in the middle of a busy hallway.

The efficiency and capabilities of the anesthesia department are severely restricted by the lack of sufficient area. It is imperative that any proposed solution address the deficiency.

Recovery Room

The HFO space planning criteria recommend 1,350 square feet of area for all recovery room functions (Table 5). Total area allocated for recovery room functions at the USAF Regional Hospital Eglin is 1,360 square feet. The primary recovery area consists of one main room of approximately 795 square feet. The area is used for recovery beds, nurses' station, drug storage and preparation, cart holding, equipment storage, surgical supplies storage, and administrative purposes.

Isolation area for recovery is colocated with the hospital's intensive care unit (ICU). The planning criteria recommend 340 square feet for isolation purposes. The surgical suite and ICU share an isolation area of 210 square feet. The rooms are monitored by closed circuit video cameras in addition to the normal monitoring devices inherent within an ICU.

The family waiting area is located on the first floor of the hospital facility and is conveniently located to restrooms, the snack bar, and the hospital's chapel.

Table 5. A Comparison of Standard Versus Actual Area in the Recovery Room Area

Recovery Room	Approximate Square Footage	
	Standard	Actual
Isolation Room (2 x 120') ^a	240	160
Isolation support (2 x 50')	100	50
Recovery beds (4 x 120')	480	455
Nurses station	40	55
Drug storage and preparation	50	45
Cart holding: clean	80	75
soiled	80	75
Staff toilet	30	25
Equipment storage	100	90
Family waiting area	100	300
toilet	<u>30</u>	<u>30</u>
Total	1350	1360

^a The set of numbers enclosed in parentheses and separated by the lower case "x" is the number of rooms or beds and the recommended square footage per room or bed.

The recovery room has been capable of supporting the surgical suite workload, and has sufficient area. Alternatives to eliminate overcrowding in other areas of the surgical suite need not include the recovery room.

Support Areas

In addition to addressing specific requirements for the surgical pavilion, administrative functions, anesthesia department, and recovery room, the planning criteria establish other support requirements. The comparison of the present areas available for support functions, in relation to the recommended standards, is presented in Table 6.

The planning criteria recommend one area for dictation per operating theater. Presently the only dictation capability within the surgical suite is a transcription machine in the staff lounge.

A conference room, for teaching purposes, is recommended by the space planning criteria. The surgical suite does not have a conference room.

The decontamination and clean-up room has less than 60 percent of the standard recommended area. The current lack of adequate area causes decontaminated surgical equipment to be placed on a table next to the soiled holding carts in the surgical suite hallway. This practice, which may not appear to be acceptable for infection control, is tolerated because the instruments are later sterilized after packing.

The clean-storage and pack preparation work area is not adequate and does not allow for ample work area. Disinfected instruments and supplies are stored and wrapped for sterilization in this area.

Gurney and wheelchair storage areas within the surgical suite are non-existent. When not in use they are placed in the main hallway of the adjoining ward and are an eyesore in addition to being a potential traffic problem.

The equipment and linen storage room has less than 75 percent of the recommended area, and is one of the rooms which is shared with central sterile supply. If this room were used for surgical supplies only, it might be possible to reduce some of the crowding in other areas of the surgical suite.

The plaster preparation and equipment storage room lacks accessibility. The only entrance to the room is through operating room number one. This restricts routine access to periods when operating room number one is not in use.

There are not any rooms presently designated for orthopedic equipment storage, portable x-ray storage, or cart holding. These items are placed within the hallways of the surgical suite and adjacent patient ward. This situation complicates housekeeping procedures and interferes with personnel movements.

There is no room or area designated for patient holding. As mentioned previously, patients are held while awaiting surgery in hallways alongside equipment and supplies.

Personal area in the staff lounge and locker rooms has been the primary complaint which brought the current overcrowding to the attention of the hospital's administrative staff. The planning criteria recommend ten square feet of locker room area per person. In the surgical suite of the USAF Regional Hospital Eglin, the 18 male technicians and physicians are provided 130 square feet of locker room area. The shortage of personal area is worsened by the poor design and inefficient layout of the male locker rooms. In many instances, three technicians must share half-lockers. The doctors are limited to

Table 6. A Comparison of Standard Versus Actual Area in the Surgical Suite's Support Areas

Support Area	Approximate Square Footage	
	Standard	Actual
Dictation areas (3 x 15') ^a	45	---
Conference room	140	---
Decontamination and clean-up	180	100
Clean storage and work area	450	245
Gurney/wheelchair storage	90	---
Equipment and linen storage	205	140
Plaster prep/storage	80	105
Orthopedic equipment storage	80	---
Portable x-ray storage	30	---
Cart holding, soiled	100	---
Patient holding	160	---
Housekeeping and janitor's closet	80	25
Lockers, male (18 x 10') ^b	180	130
toilet and shower	50	40
Lockers, female (18 x 10')	180	105
toilet and shower	50	20
Staff lounge (36 x 10')	<u>360</u>	<u>160</u>
Totals	2460	1070

a The set of numbers enclosed in parentheses and separated by the lower case "x" is the number of rooms and the recommended square footage per room.

b The set of numbers enclosed in parentheses and separated by the lower case "x" is the number of personnel and the recommended square footage per person.

quarter-lockers, approximately one cubic foot of storage area. The female locker room, which accomodates 18 individuals in a smaller area than that allotted to the male personnel, is also very crowded and does not have shower facilities.

Personal area is also less than the recommended standard in the staff lounge. It was originally designed in 1964, with 260 square feet. In 1975, the lounge was reduced by 100 square feet to create additional locker room area and currently has less than half the standard area allowed, a fact which frequently causes surgeons and technicians to relax between cases by sitting on gurneys and wheelchairs that are parked in the hallways.

Total area available for surgical suite support functions is less than 45 percent of the recommended standard. The shortage could possibly have a negative effect upon the safety, morale, and efficiency of the personnel assigned to the department.

Central Sterile Supply

Central sterile supply provides services and supplies to 18 different clinics, six inpatient wards, the surgical suite, and individuals on an outpatient basis. This study examines the location and functions of the central sterile supply workcenter because of its present colocation with the surgical suite.

Central sterile supply's services include a daily supply requisition and equipment preparation service. Each morning, central sterile supply personnel visit the clinics and pick-up contaminated instruments along with inventory requisitions. The sterilized

instruments and supplies are delivered each afternoon. The current method of supply allows a daily inventory check and requisition.

Outpatients who are prescribed items that are stocked by central sterile supply are directed to the second floor central sterile supply/surgical suite area to pick-up their items in person.

When the facility was originally designed in 1964, central sterile supply was a function of nursing services. In 1983, the service is designated as a function of medical logistics. Therefore, the space planning criteria guidelines for central sterile supply are integrated with medical logistics (Atch 2).

Area is allocated to central sterile supply by square footage of floor area and by linear feet of shelving for storage of inventory items. Area for storage is determined by the number of clinics and services supported. As seen in Table 7, 750 square feet is the area recommended to maintain 665 linear feet of supply inventories. The present area of 370 square feet allows a maximum of 355 linear feet of shelving. The lack of adequate inventory area necessitates the storage of supplies in the surgical suite and areas of central sterile supply that were designed as work areas.

In addition to providing an inventory of supply items, central sterile supply also processes sterile equipment. The area for decontamination processing should be 1,110 square feet, as recommended by the space planning criteria. The present decontamination room has 340 square feet of area. While the current criteria allow area for decontaminating distribution carts, this authorization was not included

in the 1964 criteria. The carts are currently being wiped down by hand outside the decontamination area.

The space planning criteria recommend 330 square feet to operate one large and one small steam sterilizer in addition to a large gas sterilizer and a sterile packaging area. The present sterilizing area is only 240 square feet and does not have a sufficient work area.

Table 7. A Comparison of Standard Versus Actual Area in the Central Sterile Supply

Central Sterile Supply	Approximate Square Footage	
	Standard	Actual
Sterile supply storage shelf area - 665 linear feet	750	370
Decontamination and processing	1110	340
Sterilization and assembly	330	240
Office	---	75
Cart queuing	90	---
Cart holding	<u>340</u>	<u>---</u>
Total	2620	1025

An area is not specifically designated for central sterile supply administrative functions in the 1983 space planning criteria. Administrative functions are the responsibility of the medical logistics administrative staff.

Areas are allocated for cart queuing and holding that were not previously addressed in the original design criteria.

Overall, the central sterile supply function is extremely confined in its present location. It has been cited in the past for safety and fire code violations and cannot be considered adequate to continue its assigned duties.

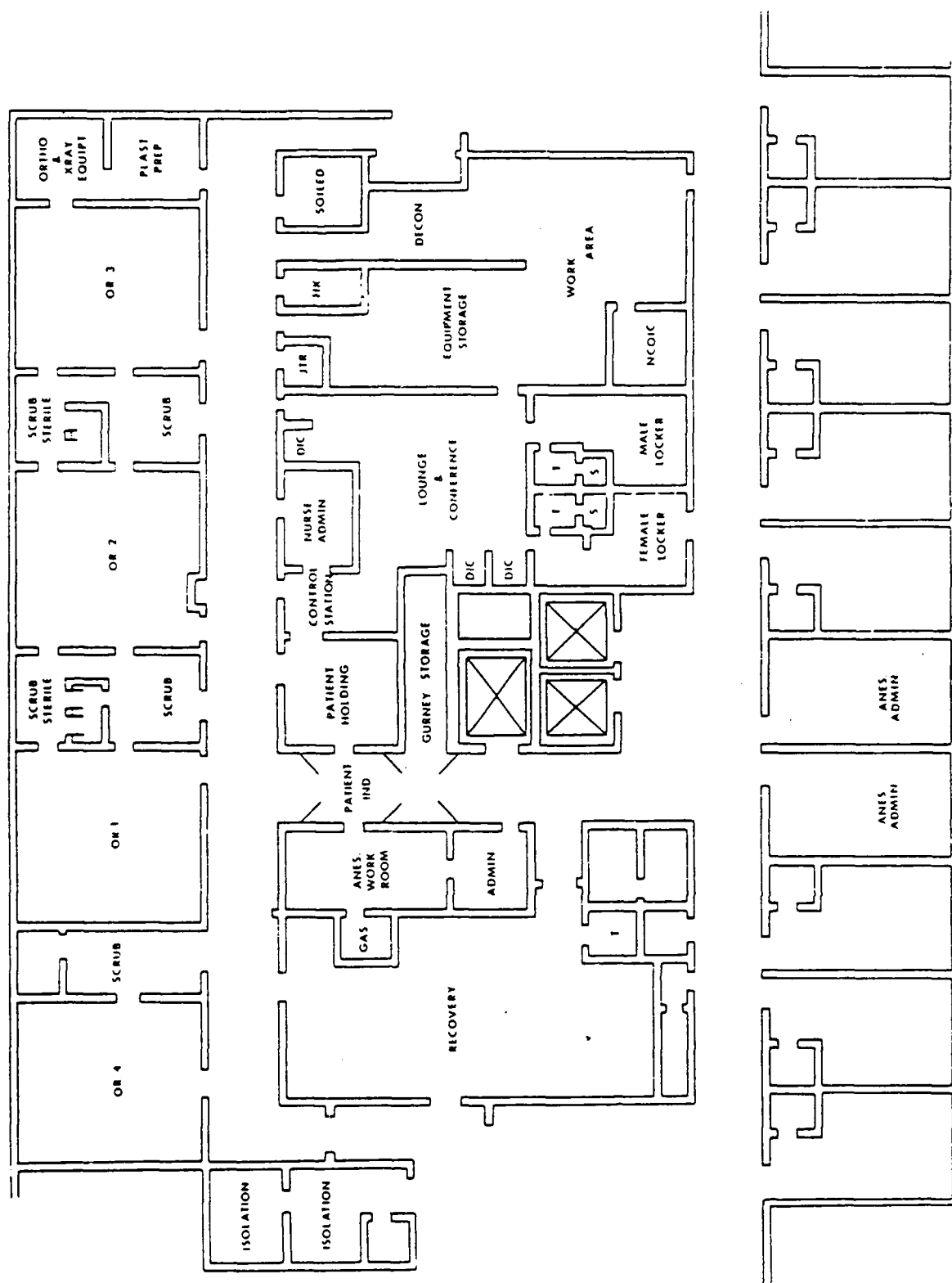
Discussion

This analysis has identified deficiencies in the amount of area available for use by the surgical suite and central sterile supply. Solutions must be developed which focus on the acquisition of additional area to relieve the congestion now present in the surgical suite and central sterile supply.

A relocation of central sterile supply would provide over 1,000 square feet of additional area for use by the surgical suite. The proposed redesign of the surgical suite is presented in Figure 2.

Acquisition of two inpatient rooms would provide an additional 500 square feet of area. While the reduction in beds would reduce the overall capacity of 200 beds, it would not reduce the current authorized bed strength of 165.

The differences between standard, actual, and proposed area allocations are presented in Table 8. The proposed modification is greater than the standard allowance, but includes over 300 square feet of substerile support area for the fourth operating room, which is not



being considered for modification. Incorporation of the proposed design will provide the necessary area to improve efficiency and safety.

A relocation of central sterile supply should have no effect upon areas serviced other than the surgical suite. Central sterile supply would be able to provide daily service to the surgical suite, in the same manner in which services are now provided to the various outpatient clinics and inpatient wards even though this viewpoint is not shared by the surgical suite's staff.

Table 8. A Comparison of Standard, Actual, and Proposed Allocation of Area in the Surgical Suite

Surgical Suite	Approximate Square Footage		
	Standard	Actual	Proposed
Surgical pavilion	1,460	1,790	1,790
Administration	300	130	305
Anesthesia	990	240	900
Recovery room	1,350	1,360	1,385
Support areas	<u>2,460</u>	<u>1,070</u>	<u>2,420</u>
Surgical Suite Total	6,560	4,590	6,800

Contrary to the personal desires of the surgical suite personnel, instrument preparation can be performed in a remote location (5, p.14). While many operating room personnel enjoy the luxury of a collocated sterile supply service it is no longer considered to be the

norm. The literature reveals that more and more hospitals are finding it advantageous to provide sterile services to surgery on a scheduled basis rather than an as needed basis (3, pp.81-97).

The Surgical Suite of the USAF Regional Hospital Eglin would still have emergency sterilization capability if central sterile supply was moved. Of the four sterilizers in use by central sterile supply, one unit cannot be moved because of its size. In order to remove the largest steam sterilizer it would be necessary to cut it in half. It would be more feasible to leave the sterilizer where it is and allow it to be used as a back-up unit, for both central sterile supply and the surgical suite. This back-up sterilization capability would be in addition to the current emergency sterilization capability. Each operating theater has a flash sterilizing unit which provides immediate service when needed, either between or during surgical cases.

A possible area for relocation of central sterile supply would be to the first floor of the facility. Storage area for central sterile supply was constructed in the southwest wing of the first floor during the 1975 facility expansion. However, the rooms are currently being used by the nursing wards and medical logistics to store equipment. Dedicating these rooms for central sterile supply use only, will provide 720 square feet of floor area. A particular advantage these rooms have to central sterile supply is that they are positioned adjacent to a subflooring with ready access to water and steam lines. Utilities access is necessary in order to relocate the central sterile services sterilizing equipment.

The acquisition of two rooms alone would not be sufficient to provide the additional area required by central sterile supply. An additional 1,900 square feet would be required to conform to the space planning criteria guidelines. Further expansion into what is now medical logistics and food services would be necessary, as proposed in Figure 3.

The receiving room for food services could also be used as a cart washing and work area for central sterile supply. An automatic cart washer could be used for the initial breakdown of returning soiled carts and also for cleaning food service carts. The common use of the area by central sterile supply and food service would benefit both departments.

Logistics administration, two private offices and a central work area, occupies 1,650 square feet and is adjacent to the areas already proposed for central sterile supply. An acquisition of the entire administrative area would provide the remainder of the area necessary to provide the recommended area for central sterile supply. The results of the proposed relocation are summarized in Table 9.

Adoption of this proposal would require a relocation of logistics administration. A move to what is now the logistics warehouse would deplete available warehouse area by 20 percent, 1,650 square feet. The loss of area could be offset through new construction, expansion with minimal difficulty. The outside walls of the warehouse are bordered by a lawn, which extends approximately 40 feet to the staff parking lot. Any expansion designed to absorb the loss of 1,650 square feet could be easily contained within the grass boundaries of the facility.

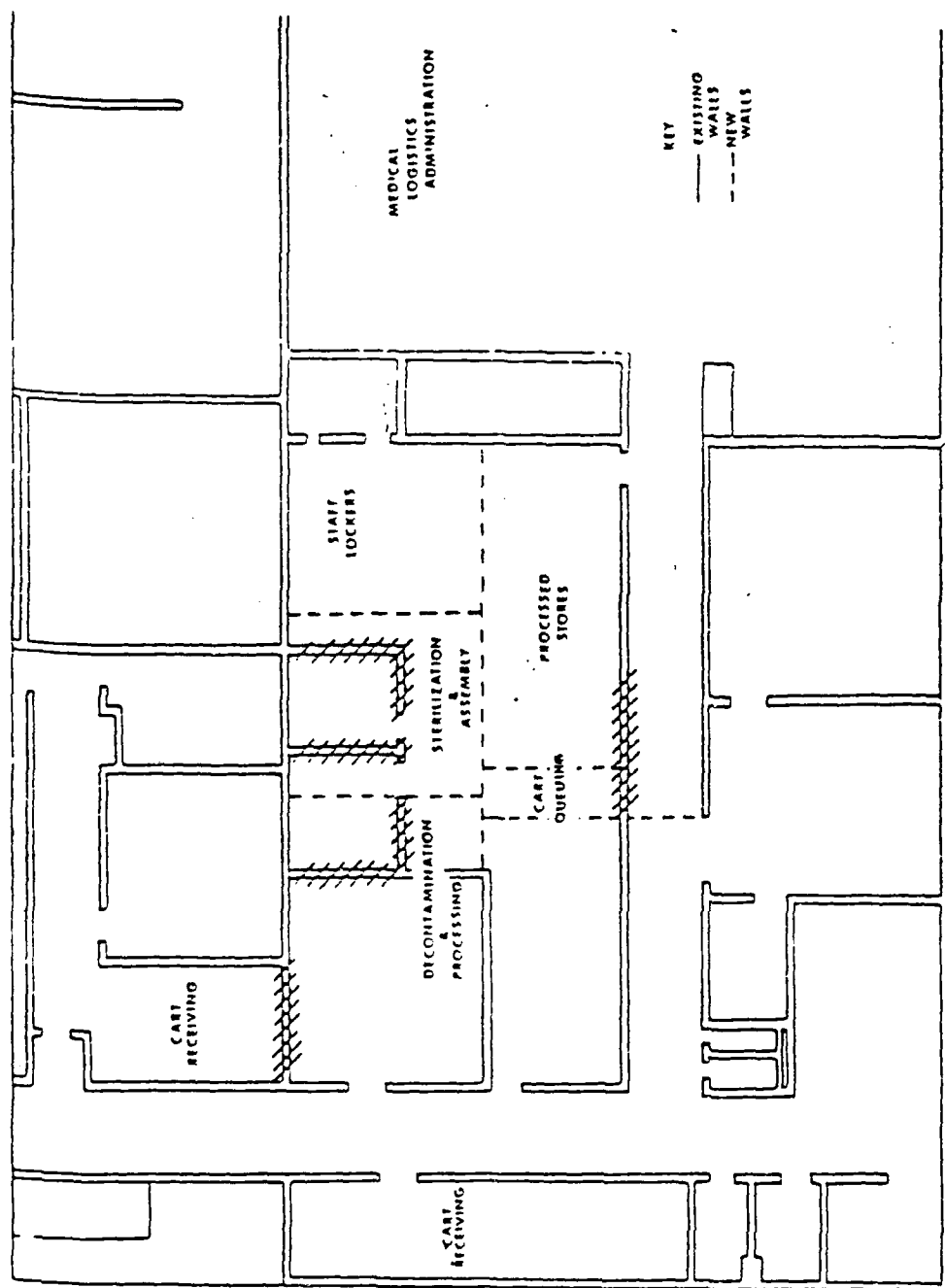


Figure 3. Proposed Relocation of Central Sterile Supply

Table 9. A Comparison of Standard, Actual, and Proposed
Allocation of Area for Central Sterile Supply

Central Sterile Supply	Approximate Square Footage		
	Standard	Actual	Proposed
Sterile supply storage	750	370	750
Decontamination and processing	1110	340	1100
Sterilization and assembly	330	240	320
Office	---	75	---
Cart queuing	90	---	90
Cart holding	<u>340</u>	<u>---</u>	<u>340</u>
Central Sterile Supply Total	2,620	1,025	2,600

The recommendation for expansion, through new construction, of the medical logistics warehouse is also based on monetary considerations. Construction costs per square foot of warehousing area is much more inexpensive, approximately \$50.00 per square foot, than is central sterile supply, \$175.00 per square foot.¹

¹Personal discussion with Mr. Carl Hurston, Plant Manager, USAF Regional Hospital Eglin, Eglin AFB, Florida, January 25, 1983.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

The evaluation of the surgical suite and central sterile supply areas provided quantitative conclusions as to the causes of the present overcrowding. Based upon the conclusions, specific alternatives were considered and recommended to correct the overcrowding.

Conclusions

The quantitative results of this study identified a variance of approximately 3,565 total square feet between the planning criteria and that area which is currently available in the surgical suite and central sterile supply. The standard area recommended for the surgical suite is 6,560 square feet and that which is available is 4,590, or 1,970 square feet deficient.

The current configurations of the surgical pavilion and recovery room areas are adequate in available area and design. Other areas of the surgical suite, administrative, anesthesia, and support areas, are deficient in available area.

In order to improve efficiency, insure personal safety, and provide adequate work areas, the procurement of additional area for the surgical suite, approximately 2,000 square feet, is necessary.

New construction, for expansion, is not possible since the surgical suite is located on the second floor. Relocation of highly

technical areas, such as the surgical suite, is extremely high monetarily. Because of the expense, a relocation of the surgical department should be considered only as a last resort.

Any expansion of the surgical suite into patient areas, which would reduce the number of operational beds, could reduce the total number of patients served by the hospital. Any reduction in patient care areas should be minimized in any solution.

The central sterile supply unit is also deficient in available area. It should be considered for relocation to provide additional area for surgical services. Any new construction necessary to accommodate central sterile services would be less expensive, per square foot, than construction for the surgical suite. A relocation of central sterile supply could provide a more generous allocation of area for both central sterile supply and the surgical suite.

Recommendations

Based upon the results of this study, an expansion of the surgical suite's available area is recommended. Additional area should be acquired through a relocation of central sterile supply and the acquisition of two patient rooms.

Central sterile supply is a responsibility of medical logistics and should be relocated to the logistics area of the facility. A relocation of central sterile supply could provide the additional area needed by both the surgical suite and central sterile supply.

The administrative functions of medical logistics, that currently occupy the area proposed to be acquired by central sterile supply, should be relocated to adjoining warehouse area.

Recommended Additional Research

Further research should be initiated to determine the requirements for overall logistics area. Any additional requirements could be met through expansion of the main facility by new construction or the establishment of a satellite warehouse.

BIBLIOGRAPHY

Cited References

- (1) U.S. Air Force "Central Processing and Distribution" Air Force Manual 67-1. Vol V, 1981
- (2) Kernaghan, S.G. "Technology and the Surgical Suite: Forest of Instrumentation Improves, but Complicates Surgical Practice." Hospitals, 56 (March 16, 1982), pp. 101-105
- (3) Kowalski, J.C. "Supply Distribution Options - A New Perspective." Hospital Materiel Management Quarterly, 2 (November 1980), pp. 81-97
- (4) Phillips, J. "Big is Best? A Study into the Optimum Size of Multi-Suite Operating Departments." NATNEWS, 17 (MAY 1980), pp. 7-14
- (5) Richardson, J.C. "Exchange Carts Really Work." Hospital Materiel Management Quarterly, 2 (November 1980), pp. 13-17
- (6) Reeves, D.M., and Faulconer, D.R. "Reorganizing an Operating Room." Today's OR Nurse, 3 (September 1981) pp. 17-22
- (7) Vandenburg, M.M. "Case Carts in Surgery Can Bring About Cost Containment." Hospital Materiel Management Quarterly, 2 (November 1980) pp. 29-36

Other References

- (8) AORN Board of Directors "Recommended Practices for Traffic Patterns in the Surgical Suite." AORN Journal, 35 (March 1982) pp. 750-758
- (9) Brooks, R.R. "An OR Nurse Manager's Guide to Budgeting." AORN Journal, 33 (March 1981) p. 657
- (10) Curry, I. "Planning Operating Departments, No. 1. The Nursing Role." NATNEWS, 19 (May 1982) pp. 9-12
- (11) Hopkins, J.H. "Computer Support for a Case Cart System." AORN Journal, 34 (August 1981) pp. 231-236
- (12) Koncel, J.A. "Practical Tips on Cost Containment: Surgical Suite." Hospitals, 54 (August 16, 1980) pp. 151-155
- (13) Schultz, J.K. "How Long can Instrument Setups be Considered Safe?" AORN Journal, 31 (March 1980) pp. 583, 856-857

From: SGL

15 April 1982

Subj: Area Utilization Survey/Surgery

To: SGA (Col Baird)

1. Purpose. Survey and evaluate Surgery areas used for storage, administration, and creature comfort. Evaluate MSgt Court's proposal. Develop alternative proposals and discuss them. Recommend a "solution."

2. People Contacted.

- a. Mr Hurston
- b. MSgt Courts
- c. SSgt Maldonado

3. Present Situation. Present space utilization is illustrated in Atch 1.

a. Locker Areas.

(1) Male. One area is used exclusively by the officers, the second is shared by officers and enlisted personnel. Both are small and congested. During the early morning, when the assigned personnel report, the areas must become intolerably crowded.

(2) Female. The area is adequate and relatively comfortable. Like their male counterparts, the area is shared by officer and enlisted personnel.

b. Break and Administrative Areas. Many of the areas are in fact used for both purposes.

(1) Recovery Area. An area is partitioned off and has an office - conference room appearance. The area was not in use during my visit. MSgt Courts explained that the anesthesia people use it for a break area and for their administration. He further explained that the anesthesia people were non smokers, while the surgery people were predominantly smokers. The coffee room was used by the smokers and this area, by the non-smokers.

(2) Nurse Station. Used exclusively for administrative purposes. It was busy, the entire time of my visit.

(3) Coffee Room. Primarily used as a break-area, but also serves as an administrative and conference area. During my visit, a surgeon was in the corner writing.

(4) Office. Used for administration and counseling. Area in use during my visit.

c. Storage Areas.

(1) Operating Rooms. Rooms 2, 3, and 4 have built in storage cabinets, as does the preparation rooms.

(2) Store Room Next to Work Room. Area is effectively used for storage.

(3) Recovery Room. Shelving effectively utilizes storage space equivalent to roughly 50% of the accompanying area used for break and administrative purposes (i.e., one-third of the "new" area in Recovery used for storage).

(4) Hall Equipment Storage. The items are placed at the end of the hall, between Operating Room #1 and the Recovery Room. The present condition detracts from the professional decor, but does not restrict traffic flow and is convenient for the primary user (Operating Room #1/Orthopedics).

4. Comments/Criteria:

a. Locker Areas. Necessary because of clothing requirements and as an area to allow for transition from street clothes to "clean" clothes. Area receives extensive use at the beginning and the end of the work day.

b. Break Area(s). Necessary because of clothing restrictions and of the tense atmosphere of Surgery. Smokers need an area to satisfy their habit (lack of such an area would raise tensions and its consequences).

c. Administrative Requirements. Surgery has administrative and counseling requirements. Our tendency is to underestimate them, their's to overestimate. Given clothing requirements, personnel problems, and patient care requirements, the present space allocation is probably justified.

d. Supply and Equipment Storage. The increasing complexity of Surgery and the long term tendency toward disposables has placed an ever increasing demand for space to support the logistic needs of Surgery. Our Surgical Suite was not designed for our present or future logistical environment. This has resulted in a tendency for Surgery to expand. It has preempted space from Central Supply (previously used for Ward Stock) and has acquired additional auxiliary space in the two first floor rooms next to Medical Logistics.

5. MSgt Court's Proposal. Although proposed theoretically to resolve an equipment storage problem, its greatest benefit would be to resolve a locker room problem (Atch 2).

a. Male Locker Room. Room 230 is ideal for the purpose proposed. It would be a vast improvement over the current male locker situation.

b. Proposed "Storage" Areas. The current male locker rooms are not designed for equipment storage. Although most of the equipment could be accommodated in these rooms, it would be with difficulty. The door ways are narrow and the rooms do not lend themselves well for internal maneuver or organization.

c. Comment. The female officers have expressed a desire for their locker area to be segregated from the female technicians. Given the ease that the proposed store rooms can be reconverted to a locker room and the inconvenience of the storage areas, it is probable that one of the rooms would be reconverted to a locker room for the female technicians. This would create a "maximize people" situation, depicted in Atch 2b.

6. Plant Manager's Proposal. Mr Hurston's suggestion would resolve the equipment storage problem (Atch 3). It would not relieve the locker area situation, and would create a break and administrative area problem. The smoking issue would come to the fore-front and anesthesia would defend its turf.

7. Bedroom to Supply Room. A second way to resolve the "Equipment Storage Problem" would be to add Room 230 to Surgery as proposed, but utilize it for equipment storage, (Atch 4). This solution would resolve the equipment storage problem, would not aggravate the administrative or break area situation, but would not relieve the locker room situation.

8. Expanded Solution. This solution allows Surgery to have its cake and eat it too. It essentially takes MSgt Court's proposal and extends it, through the annexation of a hall (Atch 5). This particular hall and exit is presently utilized to remove waste materials. With its transformation into a storage area, the waste material could be rerouted either through the present main entrance or through the "new" locker room.

Comments:

a. Infection Control may not agree with the rerouting of custodial and waste movement activities.

b. Other alternative limited expansion options are feasible, but not practical (with the exception of Central Supply, to be discussed later). Additional patient room space could be annexed, but would tend to be characterized by increased expense, diminished benefit to surgery, and extreme cost to Nursing Service efficiency.

9. Modified Solution. This is essentially MSgt Court's proposal, with amendments concerning the supply, administrative, and creature comfort areas. It accepts, institutionalizes, and organizes the areas presently being used (Atch 6). In essence, it makes the best or optimal use of a limited resource - space. This solution envisions increased specialization of space, use of partitions, and specified storage locations for individual equipment items. The total effect would be to render a more functional and professional appearance (Submarines are cramped - but highly functional).

10. A Radical Solution. This envisions the removal of all "non-surgical supplies" (Ward supplies) from the Surgical/Central Supply Areas and transforming the space formerly used for this function to specialized Surgical use (i.e., administrative, creature comfort, or more probably Surgical storage). The "non-surgical supplies" displaced, would be relocated to the rooms next to Medical Logistics and form a new section: Central Materiel Service.

a. Advantages

- (1) More space for Surgery
- (2) Outpatient Convenience
- (3) Better control of the Storage Room and their contents.

(4) Theoretically a better control of ward issues, due to specialization of functions (area is well managed by SSgt Maldonado).

b. Disadvantages

- (1) Satellite Manning
- (2) Political questions
- (3) Location, may be considered "inconvenient" by wards.

11. A More Radical Solution (CPD).

Relocate the entire Central Supply Section to the first floor.

a. Advantages

(1) Provide surgery all the possible space they need for future development and expansion (i.e., increased flexibility in Surgical Areas).

(2) Relocation of Central Supply, resolves and provides better means to work problems concerning sterilizers.

(3) Better control of materiel. This results primarily due to centralization of control, designation of an "internal" materiel manager, and cross fertilization of nursing and materiel management ideas.

b. Disadvantages

- (1) Expense
- (2) Disruption of Service
- (3) Political, transfer of control
- (4) Change. Comfort zones and habits would be disrupted. New procedures implemented.

c. Comments.

(1) The CPD system at WHMC inflicted greater change upon surgery. Changes done there and not envisioned here, include:

(a) All surgical ordering and the bulk of their supplies was given and located in CPD.

(b) Surgery's Instrument Room was given to and located in CPD.

(c) Each case was set up by CPD.

(2) The movement of the sterilizers should not disrupt the availability of instrument sets for Surgery, since they would still assemble and store them and retain flash sterilization capability.

(3) A careful audit of who does what now, should be conducted prior to the move. People should be transferred with the tasks.

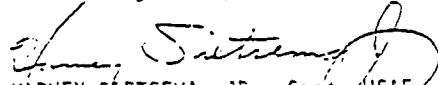
(4) No additional building modification (besides the new limited CPD, and Surgery) would be required, if a PAR or similar system is used for supply distribution (Atch 7).

(5) Manpower requirements for the section are dependent upon the tasks levied on it.

12. Recommendation. Given our present austerity, we should do nothing in the immediate future. Given more normal circumstances, propose the following actions:

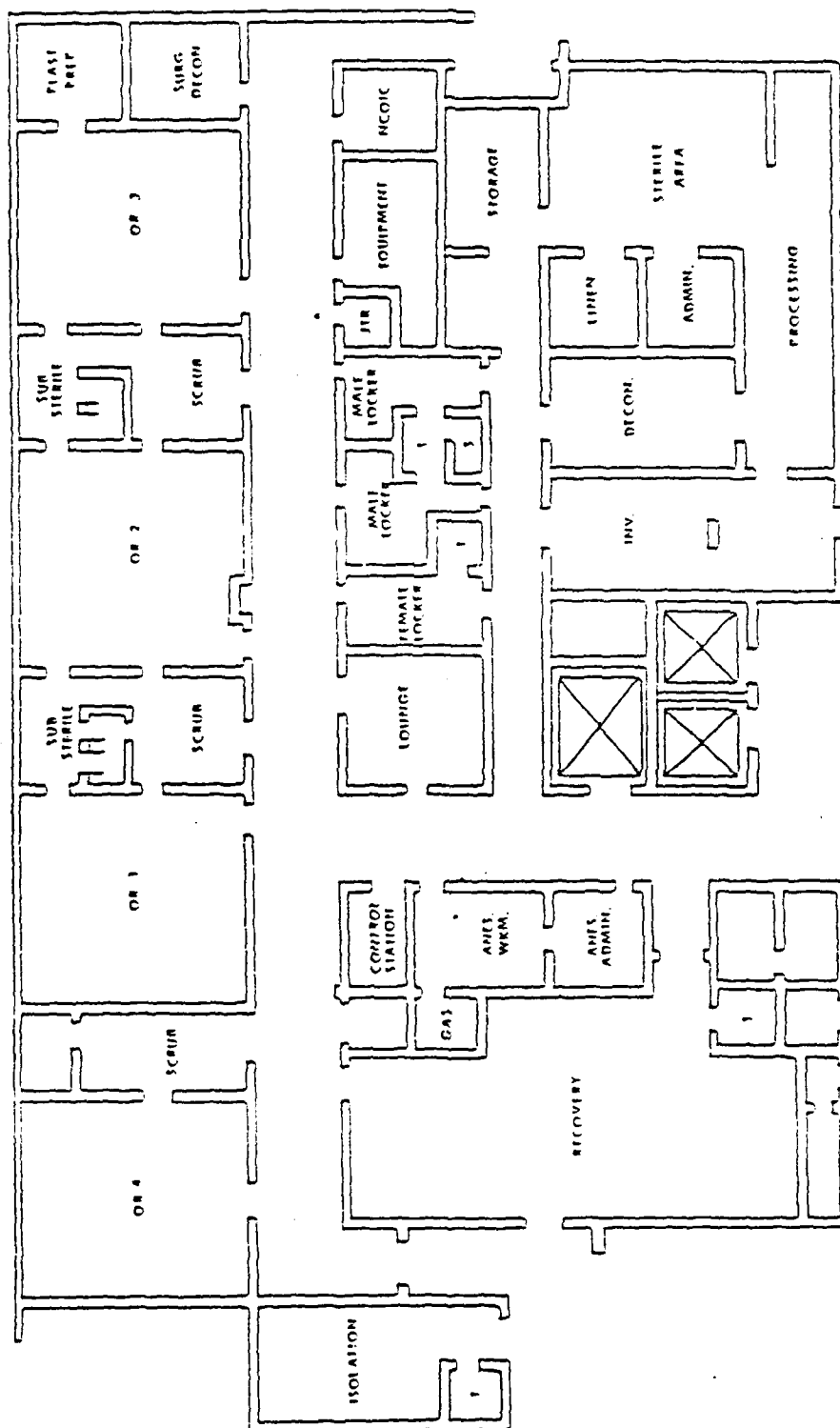
a. Immediate/Short-term Solution. Adopt the modified solution outlined in paragraph 9. This solution essentially optimizes "reasonable space" for Surgery, in relation to itself and neighboring activities.

b. Long-Run Solution. Given the prospect of continual advancement in technology and need for increased supply space, the immediate solution will not stand the test of time. To gain space for increased flexibility and meet future requirements, recommend the feasibility of a relocated limited "CPD" operation be investigated (paragraph 11).

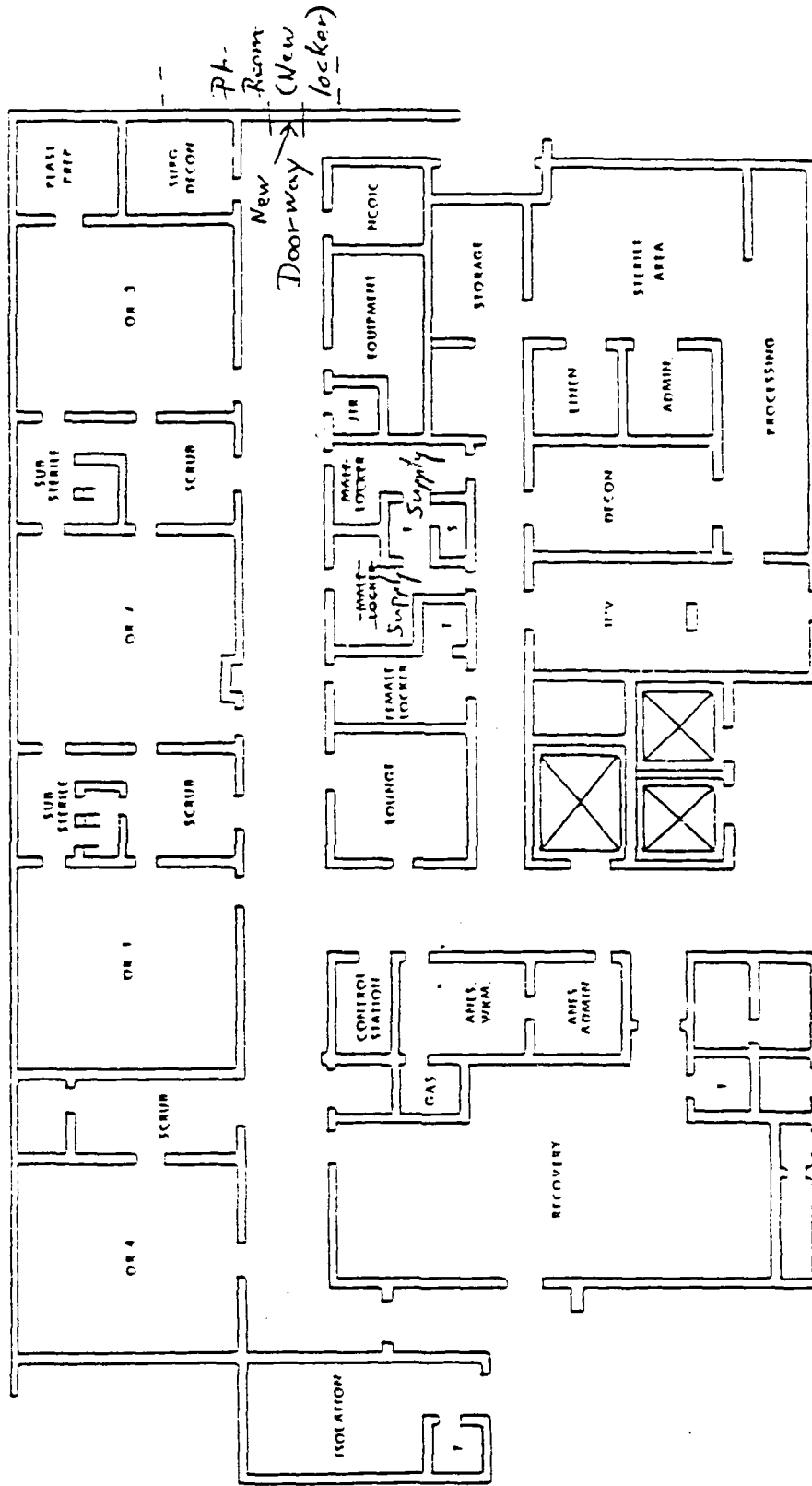

 HARVEY E. STETEMA, JR., Capt, USAF, MSC
 Director of Medical Logistics Management

7 Atch

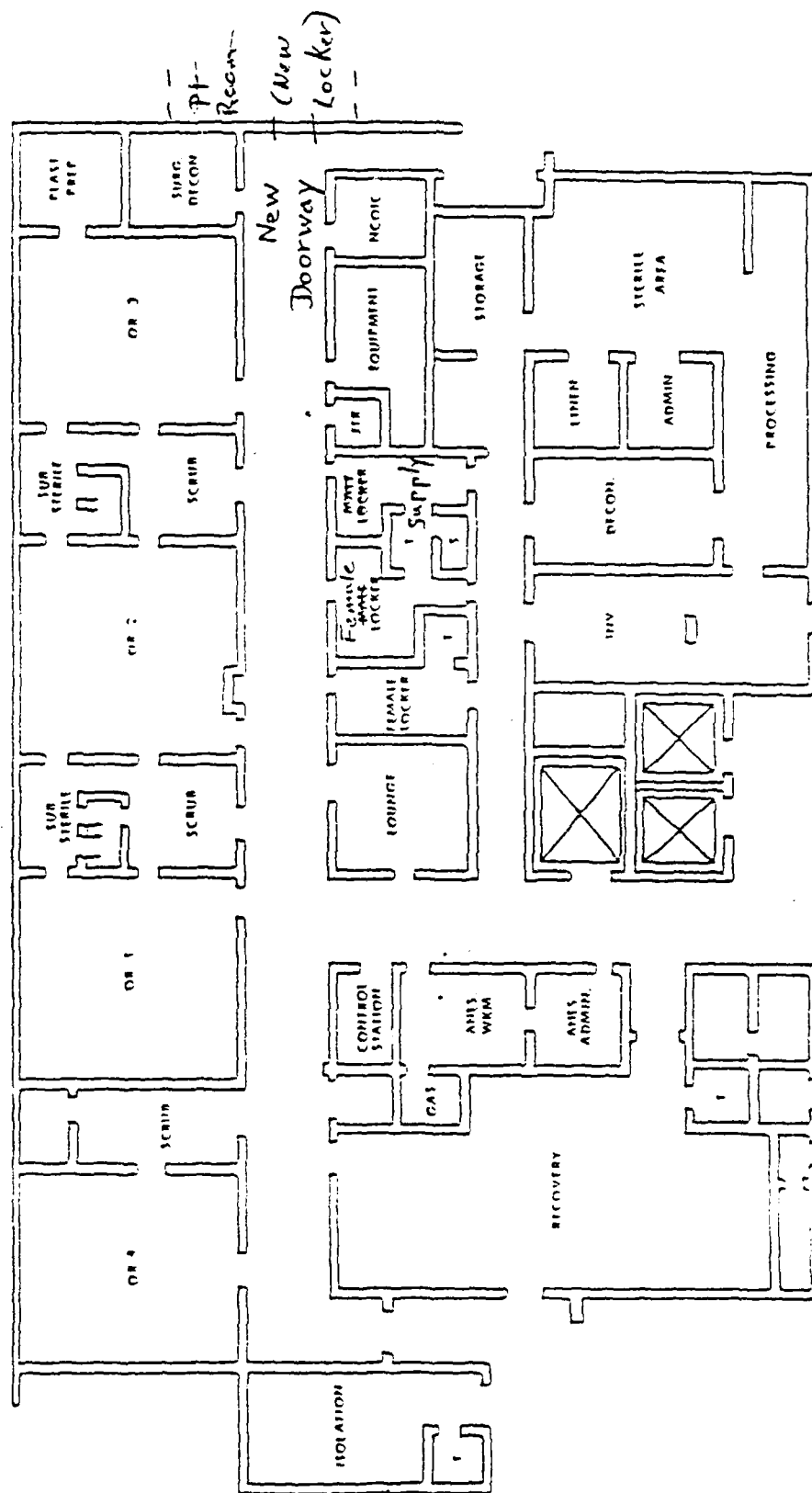
1. Present Situation
2. MSgt Court's Proposal
3. Plant Mgr's Proposal
4. Supply Emphasis
5. Expanded Option
6. Modified Solution
7. CPD/PAR



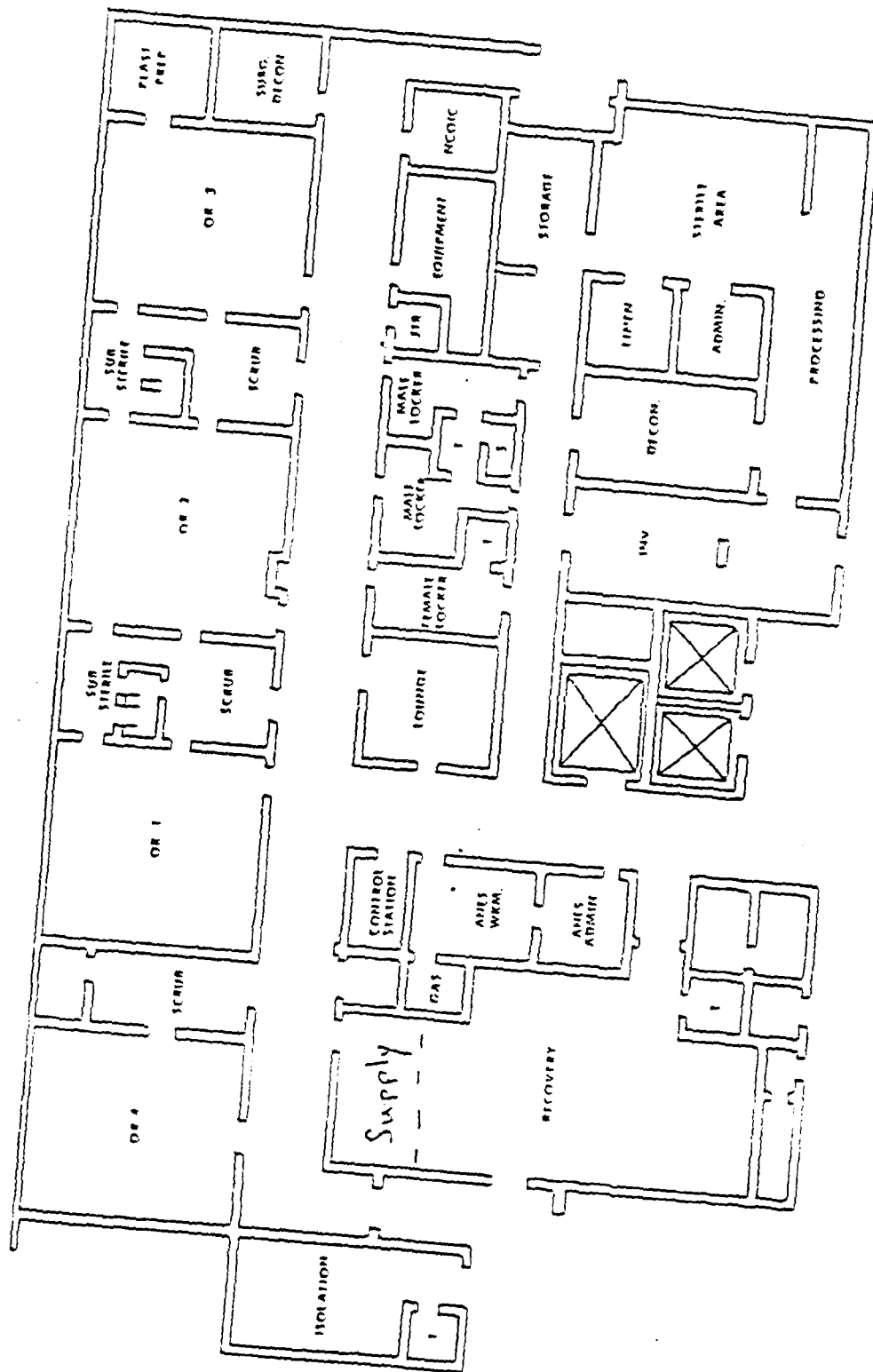
Present Arrangement (Attachment 1)



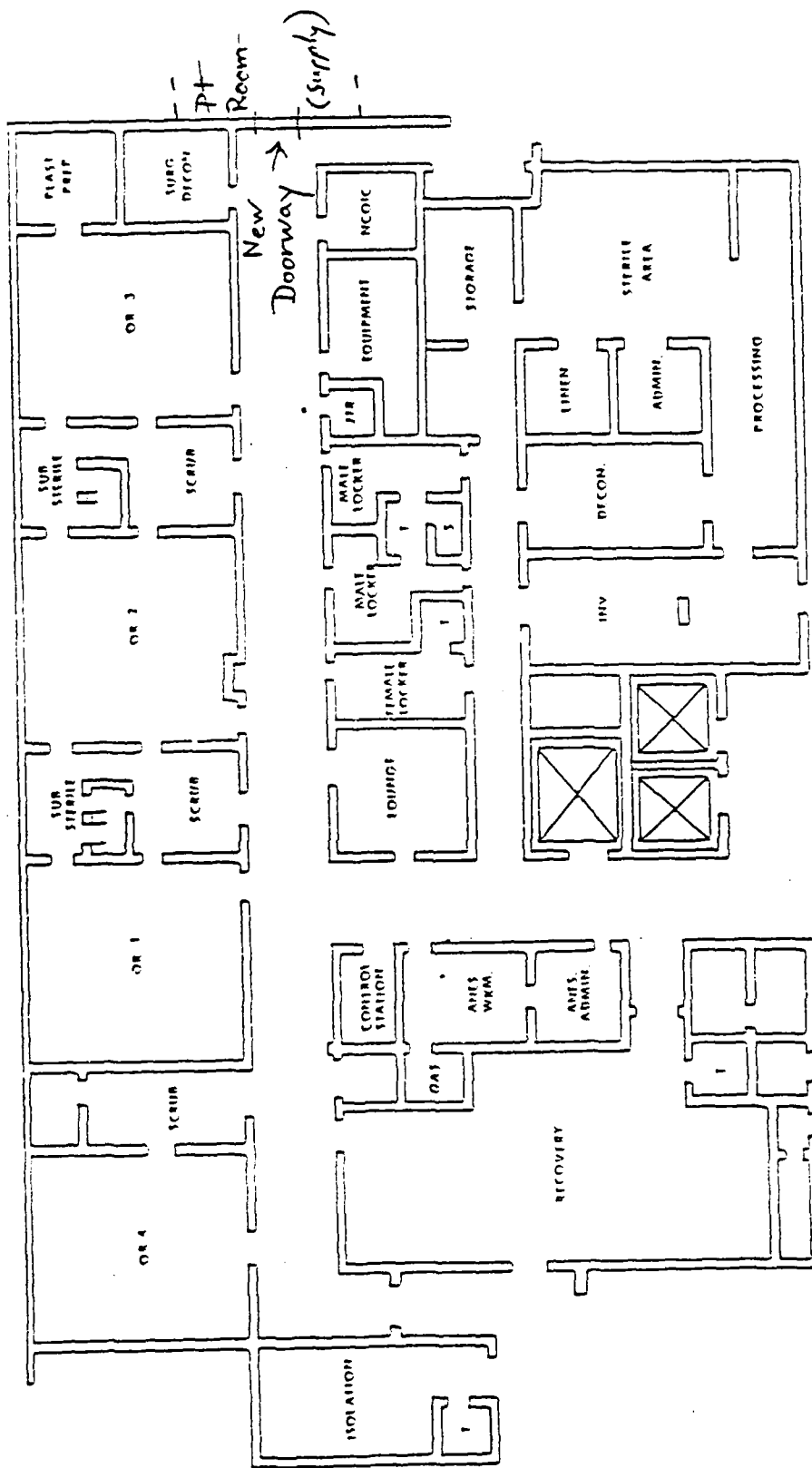
Might Court's Proposal (Attachment 2)



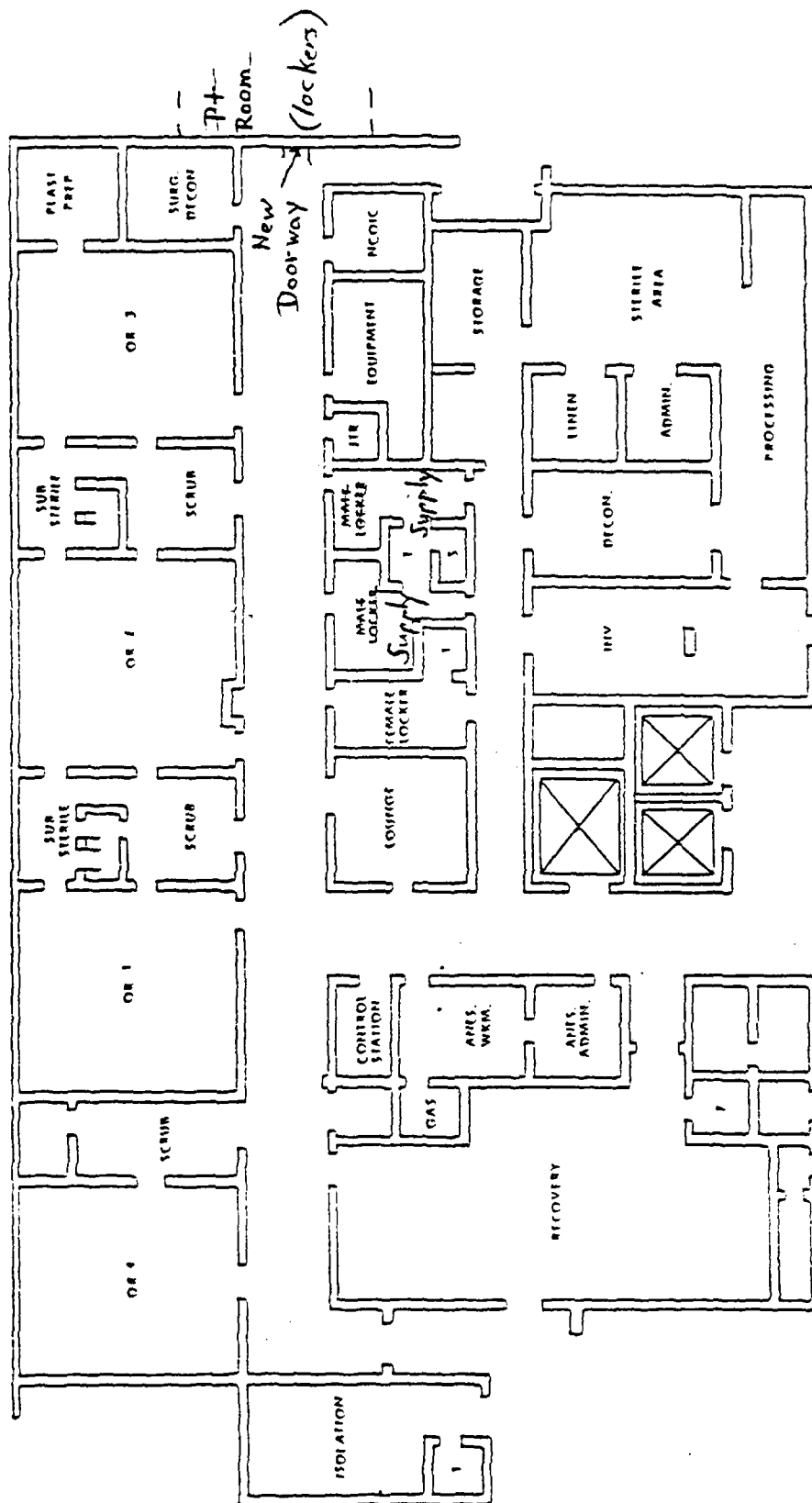
Maximize People - "Creature Comfort" (Attachment 2B)



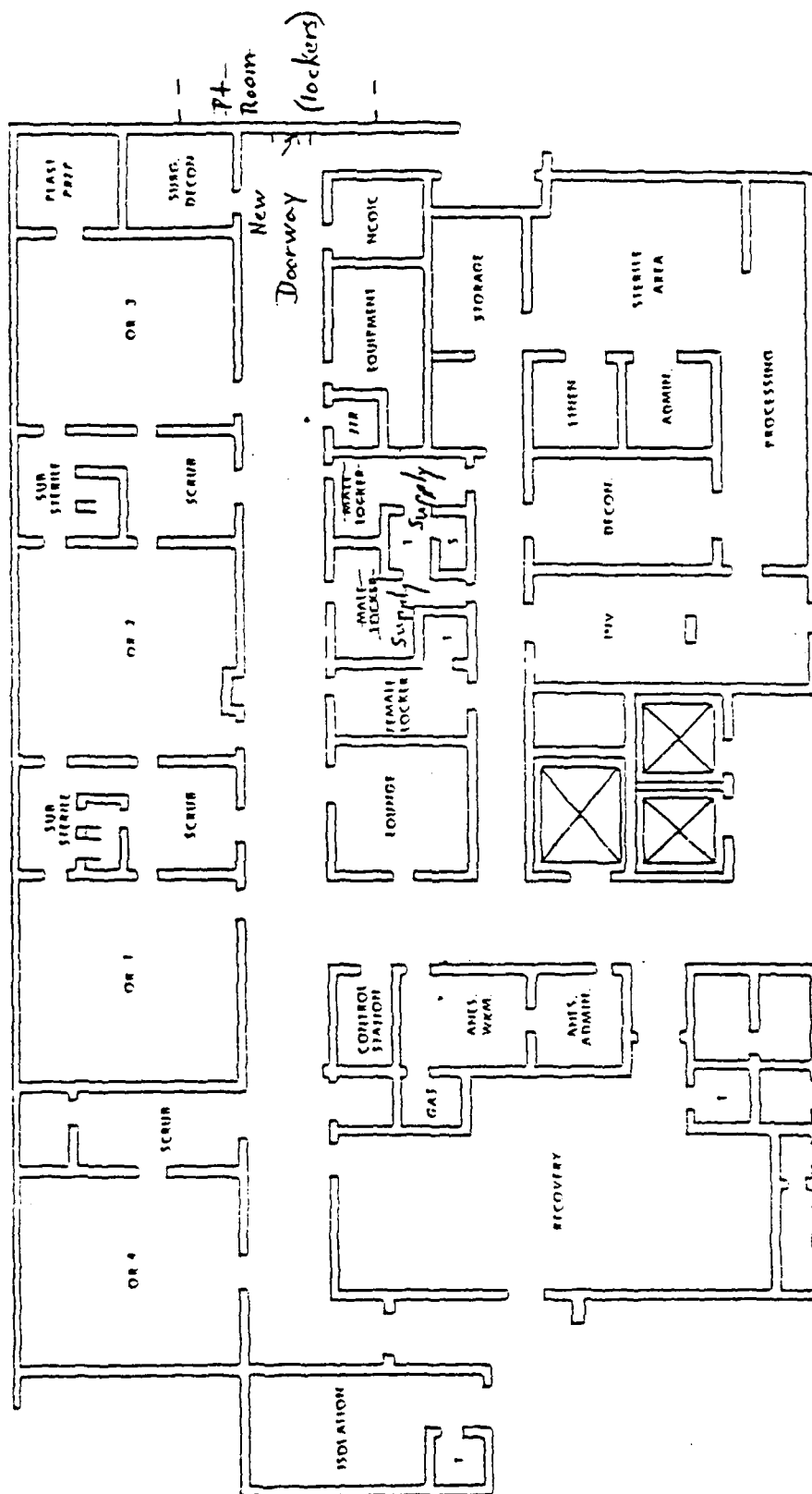
Maximize Supply - Plant Manager's Solution (Attachment 3)



Maximize Supply - Option 2 (Attachment 4)



Expanded Solution (Attachment 5)



Modified Solution (Attachment 6)

SECTION B—CENTRAL PROCESSING AND DISTRIBUTION

16. GENERAL

Central processing and distribution (CPD) is a concept which provides for a single manager who oversees materiel storage, stocking and distribution through an automatic resupply system in a medical facility. CPD is a viable concept at those medical facilities where the size and layout of the facility support such an operation. The CPD concept requires close coordination between the sterile processing function and medical materiel to assure a unified and integrated materiel management system. Although each section retains its individuality and separate organizational structure, comparable mission objectives enable a complementary cohesiveness to exist. The sterile processing function provides the processing element for sterile goods. The medical materiel activity requisitions, receives, and stores the raw materials required in the processing element. This complementary feature of both activities is united in the processed stores and distribution system managed by medical materiel. The materiel manager assures a quality controlled and efficient flow of materiel through a planned system of receiving, storage and distribution. CPD is effective in improving supply responsiveness, reducing using activity inventories and relieving health care staff personnel of routine supply matters.

17. OBJECTIVE

The objective of CPD is consistent with the primary objective stated in paragraph 3, chapter 1, which provides maximum service to patient care activities while minimizing operating and maintenance (O&M) investment in inventories.

18. CART EXCHANGE SYSTEM

a. Two identical mobile carts will be furnished to each using activity. One cart will be located in the using activity while the other cart is being replenished from the processed stores. Each cart will contain items that may be consumed during normal operations for a specific time frame. A list of supplies, including levels, will be attached to each cart.

b. Reprocessing of supply carts is based upon a rigid time schedule (paragraph 18e). At a predetermined time, a restocked cart is delivered to the using activity and the cart containing the unused supplies is returned to the cart staging area. In the cart staging area, a visual check of items remaining on the cart, versus corresponding levels, is made and the cart is restocked from the processed stores. Restocking can be effectively accomplished by the assembly line approach or other techniques dependent upon physical layout. Periodically, exchange carts must be thoroughly sanitized as specified by the local infections control committee. Normally, (c)

change carts should be sanitized biweekly. Cart sanitation procedures are outlined in chapter 27.

c. The assistant administrator/materiel and services, in coordination with using activity monitors, will determine the type of items and corresponding levels to be included on the exchange carts. These levels will be reviewed monthly to insure accuracy and applicability.

d. Account custodians will submit orders to the medical materiel activity only for items not stocked on their exchange cart. These items should be limited to nonrecurring demand and bulky items. An alternative for direct order of bulk items that do not readily fit on the cart is a bulk item automatic resupply cycle by medical materiel activity. This procedure will allow bulk items to be automatically delivered and expensed to the using activity on a fixed time schedule.

e. The time interval upon which each used exchange cart should be rotated with a fully stocked cart depends on the size of the cart and the workload of the activity. This determination must be made by the materiel manager and each CPD monitor. Activities with a heavy workload should rotate carts daily. In such cases, replenished carts will normally be dispatched by processed stores personnel to the using activity in late afternoon of each workday. Used carts will be brought to the cart staging area on the return trips. This will insure full carts in the activity during the hours the cart resupply function is closed.

19. PERIODIC AUTOMATIC RESUPPLY SYSTEM

a. An alternative to the exchange cart system is the periodic automatic resupply (PAR) system. In the PAR system, materiel personnel automatically restock inpatient activities, storage shelves with routinely used items to predetermined levels. Time frame for restocking inpatient care activities is dependent upon local conditions. However, the time frame for the PAR system, if employed, should be at least weekly.

b. The parameters for item determination and levels cited in paragraph 18 for the exchange cart system are also applicable to the PAR system. The advantages of the PAR system are the same as the exchange cart system with the added feature of lower initial investment in supporting equipment. The PAR system is especially applicable to smaller facilities.

20. MANAGEMENT OF CENTRAL DISPATCH OFFICE

c. Processed stores will also perform as the central dispatch office. All unique or emergency requests will be directed to the central dispatch office to determine if another activity may have the

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AMENDMENT 4

Para. 20A—Cont.

item, if a substitute would be appropriate, or if the item must be obtained from stock. Central dispatch initiates the appropriate action to obtain the item and provide for immediate delivery to the requester.

b. Additional routine supplies required by the using activity may be delivered or issued over-the-counter from processed stores.

21. EXPENSING PROCEDURE

Items to be stocked in the processed stores will be issued and expensed from the medical-dental stock fund directly to an inpatient processed stores account (XX5120).



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, D. C.

ADDRESS REPLY TO:

1 November 1982

REGIONAL HEALTH FACILITIES OFFICE
EASTERN REGION
SUITE 304 TYLE BLDG., 30 PRYOR ST., S.W.
ATLANTA, GEORGIA 30330

SUBJECT: Space Planning Criteria

TO: USAF Hospital Eglin/SGA (Lt William Mitchell)
Eglin AFB, FL 32542

1. Per Lt Col Christian's request, I am sending you what we have regarding space planning criteria for Surgery and "Central Sterile Supply". For both areas I have included both the older DOD criteria and the computer file which shows how our "Facilities Planning Model" figures space.

2. There is no separate "Central Sterile Supply" like there used to be in Nursing Service. The concept that has been used in recent years is to include the function in Medical Supply. A determination has not been made as to whether Nursing Service or Medical Supply should staff the function; but the space is part of Medical Materiel, so I have enclosed the Medical Materiel space planning criteria.

3. If I can be of further help, please let me know.

Kenneth O. Drees

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Space Planning Criteria

Surgical Services

Surgical Services

[File FSO400]

INPUT DATA.

Number of staff of the following specialties required:

Urologists
 Orthopods
 Neurosurgeons
 Thoracic Surgeons
 Cardio-Vascular Surgeons
 Anesthesiologists
 Anesthetists

Compute the number of Surgical Operating Rooms (SOR) as a function of available surgical beds.

Assumptions:

- (1) A percentage of total beds (excluding postpartum and psychiatric) are available to receive and hold post operative patients (POP).
- (2) The average length of stay of post operative patients is known and given (SLNS).
- (3) Efficiency of bed occupancy is known and given (EFF).
- (4) Principal Operation = one surgical patient

Beds available for post operative patients (BEDS) may be expressed thus:

$$BEDS = (Total\ Beds - (postpartum + psych)) \times POP / 100$$

$$Surgical\ bed\ days\ per\ year\ (SED) = BEDS \times 365 \times EFF / 100$$

$$Surgical\ Patients = SED / SLNS$$

Therefore, the Production Capacity (PC) of SORs is:

$$PC\ patients\ per\ year = (BEDS \times 365 \times EFF / 100) / SLNS = SED / SLNS$$

$$Total\ OR's = Bed\ Caseload\ Capacity / 3\ Cases/day/OR / 260\ Working\ days/yr / 90\ efficiency$$

Bounded up from .4

Provide Cysto OR if Urologists GE 1.

Provide Ortho OR if Med Cent and Orthopods GE 1.

Provide Neuro OR if Neurologists GE 1.

Provide Thoracic-CV OR if Thoracic or Cardio-vascular Surgeons GE 1.

Remaining OR's are General - minimum of 2.

Determine the number of Principal Operations as a function of the capacity of the planned ORs.

Principal Operations per month are therefore a determinant for the Surgical Suite staffing requirements (AFM 26-3).

Recovery Room Beds:

Provide 2 beds per OR.

[File SURGICAL]

Surgical Pavilion:

Operating Rooms:

Sub-sterile:

Provide one area per 2 ORs or fraction at 140 NSF.

Scrub:

Provide 1 4-Station scrub area per 2 OR's.

Provide 1 2-Station scrub area if odd OR.

Administration:

Nurses' Station:

Control

80 SF

ADPE

20 SF if required.

Office, Nurse

Standard Module.

Office, NCOIC

Standard Module.

Anesthesia:

Office, Chief

120 SF if Med Cent.

Office, Anesthesiologist 1 room at 100 SF per Anesthesiologist,
other than Med Cent Chief.

Office, Chief Anesthetist 120 SF if Med Cent or Regional

100 SF if Hosp.

Office, Anesthetists

1 room at 170 SF per 2 Anesthetist.

1 room at 100 SF if odd number.

Anesthesia Workroom:

Provide 150 NSF plus 50 NSF per OR over 3.

Anesthesia Gas Storage: 50 SF

Induction Room: If Regional or Med Cent, 1 station per 2 OR's
100 SF per station, maximum 4 stations.

Post-Anesthesia Recovery Area:

Isolation Room:

Provide one per 4 recovery beds at 120 NSF.

Recovery Room Beds:

Provide 120 NSF per bed.

Support Areas:

Provide the following for each 10 Beds or fraction
thereof.

Nurses Station at 60 NSF.

Drug Storage & Prep

Cart Holding, Clean at 80 NSF.
 Cart Holding, Soiled at 80 NSF.
 Staff Toilet at 30 NSF.
 Equipment Storage at 100 SF
 Family Waiting with toilet
 100 SF if LE 10 Recovery Beds
 150 SF if GT 10 Recovery beds.

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 Support Areas:

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 Dictation Area:
 Provide one per OR.

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 Conference Room:
 Provide one at 35 SF per OR if a teaching hospital.

Minimum = 140 SF
 Maximum = 300 SF

Decontamination and Clean Up:
 Provide 120 NSF per 2 OR.

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 Clean Storage and Work Area:
 Provide 150 NSF per OR.

.....
 Storage, Gurney/Wheelchair: 30 SF/OR min 90 SF.

.....
 Equipment, Apparatus and Linen.

Provide 300 NSF plus 50 SF per OR over 2.

.....
 Cart Holding, Soiled: 25 SF/OR min 100 SF.

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 Plaster Prep/Storage: 80 SF, provide 2nd room if Orthopedic OR.

Orthopedic Equipment Storage: 80 SF, provide 2nd room if Orthopedic OR.

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 Portable X-ray Storage:
 Provide one at 30 NSF.

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 Frozen Section Lab:

Provide at 80 NSF if total beds \geq 100.

.....
 X-ray Processor:

Provide one at 140 NSF only if special OR planned.

.....
 Special Recording & Monitoring Equipment:

100 SF if Med Cent and GE 2 Special OR's.

.....
 Janitor Closet:

Provide one per 4 ORs at 40 NSF.

.....
 Housekeeping:

Provide one.

.....
 Patient Holding:

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Provide 160 NSF plus 20 NSF for each increment
of 2 ORs over 4 ORs .

Personnel Support:

Staff Lounge :

Provide one combined lounge if total ORs ≤ 6
at 10 SF per person. Otherwise provide one lounge each,
men and women, at 10 NSF per respective locker.

Assuming equal occupancy ± 2 for Officer men, Officer
women, Enlisted men, and Enlisted women and /or
equivalent as a function of the planned workload
Officers and Enlisted are combined.
value, then:

occupancy/category

6	$46 \leq NV < 161$
10	$161 \leq NV < 234$
16	$234 \leq NV < 334$
18	$334 \leq NV < 411$
24	$411 \leq NV < 574$
22	$574 \leq NV$

Lockers:

Provide 10 NSF per locker.

Toilet:

Shower:

Provide 1 shower .

Lounge (when ORs ≥ 6)

Provide 10 NSF per person.

Material Services

Material Services

[File FS1500]

Medical Equipment Repair Center (MERC) Missions:
All medical centers and some regional hospitals.

[File CPD]

Administration:

Provide as a function of total personnel assigned (TPA)

See Standard Manning Equation (AFM 26-3)

Total Materiel Staff = $3.4608 + .02622 \times \text{TPA}$

Chief of Materiel Services w/ secretary & conference Room:

Provide if Medical Center

CPAD Chief and MCNIC:

Provide if TPA > 440

Dispatch Center:

Provide if Hospital at 150 NSF.

Medical Equipment Management Office (MEMO):

Provide if TPA > 440 at 250 NSF.

Materiel Officer

Provide if TPA > 31

MCNIC:

Provide if TPA > 195

Clerks: 67% of total materiel staff

Provide 60 SF per clerk.

Keypunch room:

Provide one at 60 SF, if no ADPE required

Provide one at 150 SF, if ADPE required

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Storage Space (Total medical and non-medical) :

SF = $(\text{Annual issue}/4 \text{ turnovers per yr} + \text{Emerg Res})/536$

Inventory per SF

Non-Medical Storage:

SF = $\text{Annual issue}/4 \text{ turnovers per year}/510 \text{ inventory per SF}$

Decontamination and Processing

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Compute the number of baskets processed:

Nursing Units: 1.00 baskets per 20 beds or fraction.

Nurseries: 1.00 baskets per 20 bassinets or fraction.

Emergency: 2.00 baskets per service.

Clinics: .10 baskets per workstation & treatment room.

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Recovery: .25 baskets per bed.
 Intensive Care: .50 baskets per bed.
 Coronary Care: .25 baskets per bed.
 Urology: .50 baskets per cysto or procto procedure.
 (Assume one procedure per 12 weekly visits)
 Patient discharges: 1.00 baskets per discharged patient.
 Surgery: .50 baskets per procedure.
 Obstetrics: .50 baskets per delivery.

Washer-Sterilizer:

Provide as a function of baskets processed per day at 135 NSF.

$$W = \text{baskets} \times (17 \text{ min per basket}) / .80 \times (480 \text{ min per day})$$

Special Equipment Processing:

Anesthesia equipment disinfection machine:

Machines a function of operative procedures requiring anesthesia equipment. (6 procedures per load)
 Provide at 18 NSF per machine over one.

$$M = ((\text{procedures}/6) \times 90 \text{ min}) / .80 \times 480 \text{ min per day}$$

Inhalation therapy disinfection machine:

Machines are a function of IT treatments.

$$M = ((\text{treatment}/10) \times 90 \text{ min}) / .80 \times 480 \text{ min per day}$$

 Provide 18 NSF per machine over one.

Cart Wash:

Provide for Hospitals only at 120 NSF

1 washer if <350 Beds

otherwise 2 washers

Compute number of carts as sum of each of following increments:

Operating Rooms

Nursing Units

Clinics

Labor area

Delivery suite

Nurseries

Emergency Workstations

Inhalation therapy treatments/10

Intensive care beds/12

Anesthesia procedures/6

Recovery beds/12

Food carts (not presently included)

Provide two carts per increment if exchange cart system used.

Compute number of litters requiring daily washing

as sum of each of following increment

Clinics

Operating Rooms

Delivery Rooms

Nursing Units

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Compute number of bassinets & bolsters to be washed as a function of total bassinets.

Washer=Items * 15 min cycle/.30 * 480 min per day

Cart Receiving:

Provide 15 NSF for each of 25% of total carts.

Workspace:

Provide 110 NSF per washer-sterilizer and 20 NSF for basket return belt.

Double sink area:

Provide two double sinks at 52 NSF.

Water Unit:

Provide one at 20 NSF.

Trash Sorting/Disposal:

Provide as a function of building area maintained.

Minimum = 100 NSF

Maximum = 300 NSF

Gross area (GA) is estimated, to this point, as the accumulated NSF x 1.476

SF (000)

0 ≤ GA < 65 then 100 NSF

65 ≤ GA < 100 then 150 NSF

100 ≤ GA < 200 then 200 NSF

200 ≤ GA < 250 then 250 NSF

250 ≤ GA < then 300 NSF

Housekeeping:

Provide for decontamination area.

Personnel Support:

Lockers:

Provide 1 for each non-clerical person

Assume 50 % of staff is female

Provide 10 SF per locker (minimum 100 SF)

Toilets: Provide 1 Multiple-occupancy toilet for each sex

Showers: Provide 1 per sex at 20 SF each

Sterilization and Assembly:

Large steam - 2-door - sterilizer.

Provide as a function of baskets at 60 NSF

Provide a minimum of one.

baskets/day x 2 cu.ft./basket x 20 min./load

30 cu.ft./load x .60 x 480 min./day

Small steam sterilizer:

Provide one at 60 NSF.

Large gas sterilizer:

Provide as a function of baskets at 60 NSF.

Provide a minimum of one if hospital

Provide a maximum of one.

$$= ((\text{baskets} \times 200 \text{ ft. per basket}) / (3000 \text{ ft. per load}) \times 240 \text{ min. per load}) / .80 \times 480 \text{ min. per day}$$

 ear footage of

Instruments to be stored:

2400s < 5 : 20 lin ft per OR

5400s < 7 : 25 lin ft per OR

7400s < 9 : 30 lin ft per OR

9400s : 35 lin ft per OR

Provide 15 linear ft per Delivery Room.

Provide 180 NSF per linear feet computed above.

Assembly area: Provide 60 SF per large sterilizer
 (i.e., one each sterile & non-sterile)

Processed Stores:

Sterile Storage:

Provide the amount of linear feet indicated as follows:

15 LF per clinic

15 LF per Emergency workstation

20 LF per Delivery Room

15 LF per Nursery

5 LF per labor room

30 LF per OR

15 LF per 12 recovery beds

25 LF per 12 ICU a/o CCU beds

15 LF per nursing unit

5 LF per dental clinic, radiology, pathology & pharmacy service

Cart Queuing:

Provide 15 NSF per each of 15% of carts when
 exchange cart system used, 5% otherwise.

In addition, provide 4 spaces for emergency
 carts.

Equipment and Cart Holding:

Provide 100 NSF plus 15 NSF per each of 40% of carts.

Processed Stores:

Provide at 40% of computed total storage space.

Minimum = 300 NSF

Clean Sorting and Storage (linen) :

SF = lbs per day x turnaround/8.4

Equipment wash area:

Provide one at 30 NSF.

Housekeeping:

Personnel Support:

Locker/Lounge: Provide 1 per facility

5 SF per person assigned to Materiel Svcs

Provide 110 SF minimum

Provide Men & Women toilet

Bulk Storage :

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Open Area :

Provide at 50% of computed storage space.

If facility a clinic, provide 100% of computed space.

Minimum = 200 NSF

Internal circulation:

Provide .2 x SF for internal circulation.

Receiving & Sorting Area :

Provide as a function of total storage space .

storage space.

SF = (Storage/500) x 50

Minimum 400 SF

Maximum 1800 SF

If SF > 600 recompute at 60 SF per 500 SF increment.

Form Storage:

Provide 55 NSF per 150 Beds (110 NSF min).

Equipment Storage:

Provide at 10% of sum of medical & non-medical storage.

Security Storage:

Provide 20 NSF per \$100000 annual medical issue, 40 NSF min.

Flammable and Hazardous Storage:

Provide at 110 NSF per facility

Gas Storage:

If clinic provide 2 at 50 NSF per 2 enclosures.

Otherwise provide 1 NSF per bed (2 enclosures)

Minimum 200 SF (CMP)

Maximum 600 SF

Acid Storage :

Provide 40 NSF if Regional (AF) Hospital or larger.

Uniform Service :

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Administrative Office:

Provide NMHC if beds > 200 at 35 NSF.

If beds > 50, provide one clerk per 50 beds at 35 NSF.

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Minimum 110 SF.
Uniform Issue & Storage:
Provide 200 SF
"200" : D20005(11)

Linens function:
Provide as a function of beds and laundry service.
Assume each bed generates 16 lbs linen per day.
Assume turnaround service at 3 days.

Soiled collection:
 $SF = \text{lbs per day} \times .2 \text{ cu. ft. per lb} \times \text{turnaround}/3 \text{ ft.}$

Clean Linen:
Provide at 1 SF per TPA (Round to nearest 25 SF)
Minimum 300 SF

Trash Collection:
Provide at $SF = TPA/2$ (round to nearest 25 SF)
Minimum 150 SF

Seamstress:
Provide one per 250 beds at 100 NSF each.

Receiving and Shipping Dock:
Provide one truck space per 550000 total inventory
plus one. Each at 110 NSF, minimum 240 NSF.
Program at 1/2 scope.

Transportation :
Provide one office at 110 NSF (for hospitals only).

Medical Equipment Maintenance:
Provide of no MRC.
Provide 260 SF per technician assigned (Y)
 $Y = .007394 \times \text{total personnel}$
Minimum tech spaces = 2 (Hospitals)
Minimum tech spaces = 1 (Dispensaries)

ADPE:
Provide at 20 SF, if required.

Medical Equipment Repair Center :
Provide as a function of mission assignment.

Administration :
Chief:
Provide one at 110 NSF.

Clerks :
Provide 35 NSF per clerk.
Number of clerks a function of number of repairmen authorized.
 $\text{repairmen} = \dots$
Range Clerks

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R<20	2
20≤R<30	3
30≤R	5

ALPE:
Provide at 30 SF, if required.

Classroom/Library :
provide 15 NSF per repairman.

Shop :

Open Area :
Provide 150 NSF per Technician.
Technicians a function of number of repairmen (R).
Range Techs

R<20	R-4
20≤R<30	R-6
30≤R	R-8

Audio/Sensitive Equipment :
Range SF

R<20	300
20≤R<30	600
30≤R	750

Supply/Test Equipment :
Range SF

R<10	300
10≤R<20	600
20≤R<30	750
30≤R	900

Special Shop :
Range SF

R<20	400
20≤R<30	600
30≤R	800

Equipment Storage :
Range SF

R<20	400
20≤R<30	600
30≤R	800

Support :

Housekeeping :
Range SF

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0-20	40
20-30	60
30-40	80

Toilet

Shower: provide 1 at 20 SF

Lockers :

Provide one locker per repairman-clerks-1

END

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